

REMARKS/ARGUMENTS

This amendment is responsive to the Office Action mailed 12/15/2008 wherein:

Claims 1-8, 12-23, 32, 33, and 35-38 were rejected under USC §101 as not falling within one of four statutory categories of invention [section 6];

Claim 23 was rejected under USC §112, first paragraph, as failing to comply with the written description requirement [section 9];

Claims 12 and 13 were rejected under USC §112, first paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which the Applicants regard as the invention [section 11];

Claims 1-3, 5, 12, 13, 23-26, and 31 were rejected under USC §103(a) as being unpatentable over Tuy et al. (US 5,297,043) and Nishihara et al. (US 4,903,317) [section 14];

Claims 4 and 7 were rejected under USC §103(a) as being unpatentable over Tuy et al. '043 and Nishihara et al. '317 in view of Scorse, et al. (US 5,128,776) [section 20];

Claims 6 and 8 were rejected under 35 USC §103(a) as being unpatentable over Tuy et al. '043 and Nishihara et al. '317 in view of Ransford, et al. (EP 479,563 A2) [section 23];

Claim 14 was rejected under USC §103(a) as being unpatentable over Tuy et al. '043 and Nishihara et al. '317 in view of Johnson (US 4,228,353) [section 26];

Claims 15 and 16 were rejected under USC §103(a) as being unpatentable over Tuy et al. '043 and Nishihara et al. '317 in view of Sutherland, et al. (US PUB 2005/0277823 A1) [section 28];

Claims 17 and 18 were rejected under USC §103(a) as being unpatentable over Tuy et al. '043 and Nishihara et al. '317 in view of Chui, et al. (US 5,541,473) [section 31];

Claim 19 was rejected under USC §103(a) as being unpatentable over Tuy et al. '043 and Nishihara et al. '317 and Chui, et al. '473 in view of Reinsch (US 5,134,661) [section 34];

Claims 20-22 were rejected under USC §103(a) as being unpatentable over Tuy et al. '043, Nishihara et al. '317, and Okazi (US 5,311,869) [section 35];

Claims 32, 33, and 36-38 were rejected under USC §103(a) as being unpatentable over Tuy et al. '043, Nishihara et al. '317, and Johnson '353 in view of Sutherland, et al. [section 37]; and

Claim 35 is rejected as being unpatentable over Tuy et al. '043, Nishihara et al. '317, Johnson '353, and Sutherland, et al. in view of Matsugu et al. (US 6,167,167) [section 35].

Claims 1, 12, 14-15, 17, 20, 23-24, and 31-32 were amended. No claims were canceled or added.

Claims 1-8, 12-26, 31-33, and 35-38 remain pending in this Application. Reconsideration in light of the following remarks is respectfully requested.

In section 6 of the Action, Claims 1-8, 12-23, 32, 33, and 35-38 were rejected under USC §101 as not falling within one of four statutory categories of invention. Claims 1, 12, 14, 15, 17, 20, 23, and 24 were amended to tie the claimed process to a respective apparatus. Claim 31 was amended to recite a computer program encoded on a computer-readable medium, as suggested by the Examiner.

In section 9 of the Action, Claim 23 was rejected under USC §112, first paragraph, as failing to comply with the written description requirement. Accordingly, Claim 23 has been amended to recite applying lossless compression to at least one of the plurality of frames and applying lossy compression to at least one of the plurality of frames.

In section 11 of the Action, Claims 12 and 13 were rejected under USC §112, first paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which the Applicants regard as the invention. Accordingly, Claim 12 was amended to recite "at least one frame" as suggested by the Examiner.

In section 14 of the Action, Claims 1-3, 5, 12-13, 23-26, and 31 were rejected as being unpatentable over Tuy et al. '043 and Nishihara et al. '317.

The Applicants claim in claim 1, as amended, a method of image compression and decompression for an imaging technique performed by an imaging device comprising: providing a span of interest for an acquired image sequence wherein the span of interest defines a time sequence and a space sequence in the acquired image sequence that includes analytically relevant information in the acquired image sequence; selecting at least one frame in the acquired image sequence in the span of interest, the at least one frame including at least a single image obtained from the imaging device for the imaging technique being used; applying lossless compression to the at least one frame and obtaining therefrom at least one compressed image; applying decompression to the at least one compressed image and obtaining therefrom at least one analytically relevant image; and displaying the at least one analytically relevant image, thereby displaying the analytically relevant information. As disclosed in the Application at paragraph [0017], a portion of image is defined as at least one frame or a plurality of frames, where a frame is a single image for the imaging technique being used. Applying lossless compression to the frame, or input image, produces an input image which remains intact. The claimed image compression and decompression method provides the advantages of achieving higher compression ratios with lower complexity (paragraph [0018]).

In contrast, Tuy et al. '043 teaches the acquisition and storage of image data as "p planes of $m \times n$ data" (col. 4, lines 66-68), where an operator "select[s] the boundaries of a volumetric subregion to be displayed" (col. 5, lines 23-24). This can best be seen with reference to Fig. 2 of Tuy et al. '043 which shown p planes of $m \times n$ data, and to Fig. 3C which shows a volumetric subregion comprising portions of the p planes. An operator uses a control panel to define the volume of interest (i.e., the volumetric subregion) and to cause the defined volume to be displayed on a video screen (col. 5, lines 36-39). That is, unlike the claimed method of selecting one or more entire frames as disclosed by the Applicants, Tuy et al. '043 teaches the selection of defined volumetric subregions.

The Applicants respectfully submit that since claim 1, as amended, claims a method of image compression and decompression in which a selection is made of at least one frame including at least a single image for the imaging technique being used, claim 1 is not unpatentable over Tuy et al. '043 and Nishihara et al. '317 which, in combination, teach the selection of image volumes. The Applicants further submit that this argument also applies to independent claims 12, 14, 15, 17, 20, 23, 24, and 31 as amended.

Accordingly, the Applicants respectfully request that the rejection of Claims 1, 12, 23-24, and 31, and dependent Claims 2-3, 5, 13, and 25-26 under 35 USC §103(a) be withdrawn.

In section 20 of the Action, Claims 4 and 7 were rejected under USC §103(a) as being unpatentable over Tuy et al. '043 and Nishihara et al. '317 in view of Scorse, et al. '776. The Examiner stated that Scorse, et al. '776 discloses the limitation of "archiving the analytically relevant image sequence." The Applicants respectfully submit that, for the reasons given above for allowance of Claim 1, this additional limitation does not render unpatentable Claims 4 and 7 which depend from Claim 1.

In section 23 of the Action, Claims 6 and 8 were rejected under 35 USC §103(a) as being unpatentable over Tuy et al. '043 and Nishihara et al. '317 in view of Ransford, et al. 479,563. The Examiner stated that Ransford discloses the limitation of "the user select option compris[ing] segmenting an identifiable anatomy of a patient." The Applicants respectfully submit that, for the reasons given above for allowance of Claim 1, this additional limitation does not render unpatentable Claims 6 and 8 which depend from Claim 1.

In section 26 of the Action, Claim 14 was rejected under USC §103(a) as being unpatentable over Tuy et al. '043 and Nishihara et al. '317 in view of Johnson (US 4,228,353). The Applicants note that Johnson '353 teaches a multiple phase flow meter and materials analysis apparatus 110 including an outer radiation source ring 118, a fluorescence detector ring 120, and upper and lower collimator rings 116 and 122 for the radiation transmission detectors 114 and fluorescence detectors 120, respectively (col. 14, lines 54-61). Radiation source ring contains a plurality of chambers for holding radiation sources and filter apertures for controlling the angle as which rays are emitted from the respective sources (col. 15, lines 12-18). As Tuy et al. '043 teach a non-invasive examination apparatus for examination of the interior of a subject (col. 4, lines 11-14), and Nishihara et al. '317 teaches an image processing apparatus comprising a loss-compression circuit, an expansion circuit, and a difference circuit (Abstract), there would be no motivation to combine the teachings of Johnson '353 with the teachings of Tuy et al. '043 and Nishihara et al. '317, as suggested by the Examiner. Moreover, even is some motivation could be imagined, there is no teaching as to how the device of Johnson '353 could be integrated into the system of either Tuy et al. '043 or Nishihara et al. '317. Accordingly, the Applicants submit that the rejection of claim 14 under USC §103(a) should be withdrawn.

In section 28 of the Action, Claims 15 and 16 were rejected under USC §103(a) as being unpatentable over Tuy et al. '043 and Nishihara et al. '317 in view of Sutherland, et al. (US PUB 2005/0277823 A1). The Examiner stated that Sutherland discloses the limitation of "capturing x-ray angiograms and comparing a series of angiograms over a time period." The Applicants claim, in claim 15 as amended, a method of image compression and decompression for images obtained by an x ray angiogram device, comprising: providing a span of interest for the images obtained by the x ray angiogram device, wherein the span of interest defines a plurality of frames

in a time sequence between two time instances that includes analytically relevant information in the images, the plurality of frames including a plurality of single images obtained from the x-ray angiogram device; applying lossless compression to the plurality of frames and obtaining therefrom a compressed image sequence; applying decompression to the compressed image sequence and obtaining therefrom an analytically relevant image sequence; and displaying the analytically relevant image sequence. The Applicants submit that, by applying to Claim 15 the same arguments given above for allowance of Claim 1, this additional limitation does not render unpatentable independent Claim 15 and dependent Claim 16.

In section 31 of the Action, Claims 17 and 18 were rejected under USC §103(a) as being unpatentable over Tuy et al. '043 and Nishihara et al. '317 in view of Chui, et al. (US 5,541,473). The Examiner stated that Chui, et al. '473 discloses the limitation of "compressing MRI image sequences." The Applicants claim, in claim 17 as amended, a method of image compression and decompression for images obtained by an MRI device, comprising: providing a span of interest for the images obtained by the MRI device, wherein the span of interest defines a plurality of frames in a time sequence between two time instances that includes analytically relevant information in the images, the plurality of frames including a plurality of single images obtained from the MRI device; applying lossless compression to the plurality of frames and obtaining therefrom a compressed image sequence; applying decompression to the compressed image sequence and obtaining therefrom an analytically relevant image sequence; and displaying the analytically relevant image sequence. The Applicants respectfully submit that, by applying to Claim 17 the same arguments given above for allowance of Claim 1, this additional limitation does not render unpatentable either independent Claim 17 or dependent Claim 18.

In section 34 of the Action, Claim 19 was rejected under USC §103(a) as being unpatentable over Tuy et al. '043 and Nishihara et al. '317 and Chui, et al. '473 in view of Reinsch '661. The Applicants respectfully submit that, for the same arguments given above for allowance of Claim 17, this additional limitation does not render unpatentable Claim 19 which depends from Claim 17.

In section 35 of the Action, Claims 20-22 were rejected under USC §103(a) as being unpatentable over Tuy et al. '043 and Nishihara et al. '317 and Okazi '869. The Examiner based the rejection on the disclosure by Zanelli '657 of using an ultrasound device to acquire image data. The Applicants claim, in claim 20 as amended, a method of image compression and decompression for images obtained by an ultrasound device, comprising: providing a span of interest for the images obtained by the ultrasound device, wherein the span of interest defines at least one frame in a time sequence and a space sequence, the at least one frame including at least a single image obtained by the ultrasound device; applying lossless compression to the

least one frame and obtaining therefrom a compressed image sequence; applying decompression to the compressed image sequence and obtaining therefrom an analytically relevant image sequence; and displaying the analytically relevant image sequence. The Applicants respectfully submit that, for the same arguments given above for allowance of Claim 1, this additional limitation does not render independent Claim 20 unpatentable.

In section 37 of the Action, Claims 32, 33, and 36-38 were rejected under USC §103(a) as being unpatentable over Tuy et al. '043, Nishihara et al. '317, and Johnson '353 in view of Sutherland, et al. In section 42 of the Action, Claim 35 was rejected as being unpatentable over Tuy et al. '043, Nishihara et al. '317, Johnson '353, and Sutherland, et al. in view of Matsugu et al. (US 6,167,167). The Applicants respectfully submit that, for the same arguments given above for allowance of Claim 1, Claims 32, 33, and 36-38 should be allowable as well. In view of the foregoing Amendment and for the reasons set out above, the Applicants respectfully submit that independent Claims 1, 12, 15, 17, 20, 23, 24, and 31 are now in condition for allowance. The Applicants further submit that the remaining Claims, each of which depends, directly or indirectly, from one of the independent Claims are now also in condition for allowance. Favorable reconsideration and prompt allowance of the application are respectfully requested.

Should the Examiner believe that anything further is needed to place the Application in condition for allowance, the Examiner is requested to contact Applicant's undersigned representative at the telephone number below.

Respectfully submitted,

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